

## **The Teaching Needs of Engineering Faculty Compared with Business Faculty: How the Library and Librarian Fit In**

**Ms. Erin Rowley, University at Buffalo, The State University of New York**

Erin Rowley is the Head of Science and Engineering Library Services at the University at Buffalo and serves as the Engineering Librarian. Her research interests include the use of technical standards in engineering education, the role of the librarian in entrepreneurial information literacy, and collaboration between business and engineering librarians in academia.

**The Teaching Needs of Engineering Faculty Compared to Business Faculty:  
How the Library and Librarian Fit In**

## **Abstract**

Subject or liaison librarians are frequently asked to provide information literacy instruction in their assigned departments. However, not much in the literature explores how else librarians can support faculty teaching needs beyond information literacy. This paper compares the results of two separate studies conducted by the author that examined the teaching needs of faculty from business and engineering. Business faculty were interviewed as part of a multi-site study in 2018 led by Ithaka S+R, while the engineering faculty study was done separately by the author in 2020. Interview transcripts from both studies were coded and analyzed to discover any overlap in teaching needs between business and engineering faculty and how the library and librarian fit into the narrative. Ultimately three core themes emerged: student literature research skills, project-based learning, and electronic access to materials and resources. Recommendations for additional research and future librarian collaborations, as well as faculty outreach, are prescribed.

## **Introduction**

Subject librarians, also referred to as liaison librarians, frequently assist with library research skills and library resource instruction in the realm of academic librarianship. Typically, this occurs through separate research consultations requested by students or, occasionally, faculty, or via an invitation to deliver a one-time information literacy lecture in a class. This lecture is commonly referred to as the “one-shot,” as this is the librarian’s one opportunity to speak with students on library resources and library research best practices.

Beyond this, subject librarians can work with faculty in other ways related to their teaching needs, although the literature shows this is not a common occurrence. However, the author had

two unique experiences of connecting with faculty from two major schools at the University at Buffalo: the School of Engineering and Applied Sciences (SEAS) and the School of Management (SoM) [1, 2]. These studies were conducted and examined separately, but the author recognized the overlap in some of the faculty interview responses. Therefore, an opportunity existed to compare the responses from engineering and business faculty.

In 2018, fourteen U.S. academic institutions, including the University at Buffalo, participated in the Ithaca S+R-led multi-site research study investigating the teaching practices of faculty providing undergraduate-level instruction in business [3]. Ithaca S+R is a not-for-profit organization that provides guidance and support for academic and cultural communities [4]; they have led multiple multi-site studies with the aim to interview faculty, but this was the first study that focused on the teaching needs of faculty rather than research needs [5-13]. In all instances, these studies have included questions and topics related to the library and librarians to determine if the organization or the liaison could provide additional assistance to the faculty they serve.

The information gleaned from the interviews with business faculty was enlightening, but as the author serves as the Engineering Librarian and not liaison to the SoM, a second study was conducted (without Ithaca S+R) in Summer 2020 with engineering faculty. The initial goal was to determine if the author could provide additional support or services for engineering faculty related to their teaching (for undergraduate or graduate-level courses). However, it quickly became clear that there was some overlap between the business and engineering faculty responses. Therefore, the goal of this paper is to review the responses from both studies to compare the needs of the faculty from both engineering and business, and to determine where the

overlap in needs exists. By determining the overlap, UB librarians could then coordinate outreach and instruction activities that would be beneficial for both of these major schools, as well as potentially streamline collection development needs.

### **Local Context**

The University at Buffalo (UB) is part of the State University of New York (SUNY) system, which comprises 64 campuses. As of the 2021-2022 academic year, it has 32,347 students with 22,306 undergraduate students and 10,041 graduate-level students. The student population represents 48 states and 102 countries [14]. UB has three campuses with 13 schools and colleges.

The School of Management (SoM) at UB has included an undergraduate business administration program since 1923. The SoM states that 2,975 undergraduates were associated with the program for the 2021-2022 academic year, with another 969 in masters level programs, 39 students in the Ph.D. program, and 73 full-time faculty members [15]. Six academic departments make up the SoM: Accounting & Law, Finance, Management Science & Systems, Marketing, Operations Management & Strategy, and Organization & Human Resources.

The School of Engineering and Applied Sciences (SEAS) at UB as of Fall 2021, has 253 faculty with 4,820 undergraduate students and 2,620 graduate-level students [16]. The school has ten ABET (formerly Accreditation Board for Engineering and Technology) accredited undergraduate programs and is home to nine academic departments: Biomedical Engineering; Chemical & Biological Engineering; Civil, Structural, & Environmental Engineering; Computer

Science & Engineering; Electrical Engineering; Engineering Education; Industrial & Systems Engineering; Material Design & Innovation; and Mechanical & Aerospace Engineering.

## **Literature Review**

There are many individual topics the author consulted as part of the literature review, as will be discussed. However, to date, there have been no similar studies comparing the teaching needs of engineering faculty to business faculty, especially concerning where the library and librarian can assist. Therefore, the author examined the literature for information on the teaching needs of engineering and business faculty (together and separately). The author also conducted literature searches for how libraries, specifically academic libraries and subject librarians, support the teaching needs of engineering and business faculty.

### *Teaching Needs of Faculty*

The literature review did not find any studies or cases specifically looking at both STEM (science, technology, engineering, and mathematics) and business teaching needs together. However, several papers were located that looked at either STEM or business teaching needs. Ireland, Thompson, and Bourke were part of the Ithaca S+R study examining the needs of business faculty; they created a report of their findings and published it in their institutional repository [17]. While other participating institutions did the same, including the author of this publication [1], the authors went on to publish a peer-reviewed article on their findings [18]. In their study of business faculty teaching needs, Ireland, Thompson, and Bourke found three themes: textbooks and course materials, the role of technology and motivation. They also found that the concepts of “time as a barrier and the desire to improve” as additional themes that were

woven through the discussions of the other three main themes. This paper was based on findings from the same multi-site study the author of this paper participated in with business faculty at UB. What is worth noting is that the Ireland et al. paper also included Computer Science faculty in their interviews related to business, as computer science falls within the School of Business at Murray State University in Kentucky.

Numerous papers exist about various areas of engineering education, but few delve into the teaching needs of the faculty, focusing instead on concepts related to how to teach effectively for students. Problem-based learning, teaching for understanding, and other various teaching methods dominate the literature landscape. Some articles focus on professional development opportunities for faculty, but, again, little exists related to other support available or needed by teaching faculty [19-22]. While outside the scope of this research, it is of note that some literature exists that examines the teaching needs of faculty, but those papers are focused on those teaching in the health sciences [23-26]. It should also be noted that the papers on the professional development of faculty or teaching needs of health sciences faculty do not tie in the library or librarians into the conversation.

The Hixson, et al. paper does report on the teaching needs of engineering faculty, specifically focusing on future engineering faculty [27]. They share how they developed the Rising Engineering Education Faculty Experience (REEFE), “an innovative faculty apprenticeship program for engineering education graduate students.” The program looks to address several areas when preparing new and future engineering faculty, including teaching needs. Like the other papers cited thus far, neither the library nor librarians are mentioned in this paper.

Hora and Lee explore the teaching needs of faculty, specifically those in STEM, that have industry experience in their Wisconsin Center for Education Research working paper [28]. The paper found that industry experience in science, engineering, and technology fields was highly desired by colleges and universities for teaching positions for several reasons, but chief among them, for the “cutting-edge training” they could provide students. While the paper looked at STEM faculty, it chose to focus on how those faculty with industry experience taught their students cognitive, intra-, and interpersonal skills. Again, since this paper focused on teaching their students about skills not related to library research, it was not surprising that librarians or the library were not mentioned.

A paper that did examine faculty and the library was authored by Korobili, et al. and explored the “factors that influence the use of library resources by faculty members,” which centered on electronic resources versus print sources [29]. While teaching was not the only focus for this research, it was touched upon. They found at their institution in Greece, faculty preferred print resources to electronic ones. Comparatively, faculty preferred electronic resources to print for their own research. However, as the authors state, further research is needed overall, and in the context of this literature review, this paper did not delve deeper into understanding how these resources, regardless of format, impact faculty teaching needs.

#### *Librarians Providing Information Literacy Instruction for Engineering and Business Students*

While there are many papers examining the role of the academic liaison librarian providing information literacy instruction from a general perspective, the focus of this paper is on



engineering and business, so the literature review focused on those academic areas. There are a large number of papers that focus on engineering information literacy skills [30-37] and still more tackle the area of information literacy instruction for business students [38-43].

Phillips, et al. conducted a systematic literature review of engineering information literacy instruction, concluding, “the literature of engineering information literacy is growing” [44]. When searching in the Scopus and Compendex databases, the topic of engineering information literacy brought back 649 articles for a 15-year time span (2000-2015). Of the 649, 120 articles were published in 2016 and 2017, which is a significant percentage. Despite the number of articles, the paper notes that “there is no clear answer to the questions of a most effective instruction method” for engineering information literacy.

Fiegen conducted a literature review in 2011 related to business information literacy with the intent “to identify preferred instructional practices and generally accepted conceptual models for business information literacy” [45]. The study looked at articles from 1980 to 2009. The author stated that “collaborations between business faculty and business instruction librarians are strong and a significant factor in high-quality evidence-based research.” However, the author of this study stated a “concerted initiative” is needed, moving forward, between business faculty and librarians.

As both the Fiegen article, along with the Phillips, et al. paper and the others reviewed and cited, focused exclusively on information literacy instruction, it was anticipated that the papers would not provide additional insight into how librarians support faculty teaching needs. Beyond

information literacy and other library related instruction, there is very little literature that covers the topic of how librarians can directly support faculty teaching needs. At the time of writing, the author of this paper did not find any papers that interviewed faculty about their teaching needs, outside of the original Ithaca S+R study and the Ireland, Thompson, and Bourke papers mentioned previously.

## **Methodology**

As this paper examines and compares the results from two similar studies, the methodology details that follow are the same for both studies, except where explicitly noted. The studies received UB Institutional Review Board (IRB) approval separately: IRB #00002643 for the business faculty study in 2018, and IRB #00004324 for the engineering faculty study in 2020. Both studies were arranged as semi-structured interviews of teaching faculty. Both studies received administrative approval from within their respective schools.

The target audience of each study differed slightly. In the SoM study, the focus was on instructors (of any level or department) teaching undergraduate-level courses in business. In the SEAS study, instructors of both graduate and undergraduate engineering courses were contacted, but only those from the Department of Mechanical and Aerospace Engineering (MAE) and the Department of Industrial and Systems Engineering (ISE). In addition, the author only contacted engineering instructors who had not previously requested in-class library resource instruction.

Participants in both studies were recruited by personal emails. Thirty faculty from all six SoM departments were contacted and eight agreed to participate. Fifteen ISE faculty and twenty-one

MAE faculty were contacted. Four MAE faculty and three ISE faculty agreed to participate in the study. However, one MAE faculty had to unexpectedly withdraw prior to the interview. It should be noted that the population of the SoM study was relatively small as it contributed to the larger multi-site study conducted by Ithaca S+R. The SEAS study was also a relatively small population which the author contributes to the timing of the study shortly after the beginning of the Covid-19 pandemic. Also, both studies were conducted solely by the author, which posed a time constraint and had an impact on the total number of faculty that could feasibly participate.

All faculty were presented with a copy of the IRB-approved consent form prior to the interview. While all SoM study interviews were conducted in person, due to the timing of the SEAS study (Summer 2020), the interviews were held on Zoom. For transcripts of in-person interviews, the author used and recorded using an iOS application, Otter, on the author's iPhone. The recorded Zoom interviews provided a transcript with the recording. Once the transcripts from both studies were reviewed for accuracy, the audio (and video, if applicable) files were deleted. The transcripts were de-identified and stored in a password-secured Box folder that only the author has access to.

The SoM interviews followed a semi-structured format using questions formulated by Ithaca S+R (Appendix C). The SEAS interviews also followed a semi-structured format, but the questions were modified slightly for the author's purposes (Appendix D). The author made the decision to alter the questions from the SoM study for two primary reasons: 1) the opportunity to ask faculty about the impact of Covid-19 on their teaching, and 2) the original Ithaca S+R study had a portion of questions related to technology that the author did not feel were necessary from

the perspective of the Libraries. Interviews from both studies lasted between 30 and 60 minutes. No follow-up questions were sent to participants after the arranged interview time.

Coding and analysis were then conducted for each study. For the purposes of this paper, the transcripts were freshly coded and analyzed as one group. Coding and analysis were done manually in the previous studies and has been done so again for this comparison of results, as this method proved to be the most efficient for the author due to the relatively small number of transcripts. All interview transcripts were re-read by the author for this comparison study. Broad codes were, as in the other two studies, assigned during the initial read-through of the interview transcripts. During the second and third readings, additional codes were assigned (Appendix E). The codes, like the other two studies, largely followed the main topics of questioning from the interview guide. The original codes and themes from the first two studies were used as a guide, as well, to ensure consistency of language between the studies and this comparison.

The author used an inductive reasoning approach in reviewing the interview transcripts again. As was stated in the author's 2021 paper,

Some existing theories on how the faculty would respond were based upon the previous Ithaca S+R-led study. This included how faculty would respond when asked about preparation for their courses; the author assumed faculty ... spent a large amount of time creating materials and resources for their courses [2].

After reviewing the codes, three major themes emerged, as occurred in the prior studies. The results section will cover these themes, as well as specific details of what faculty shared that provide insight into their teaching needs.

## **Results and Discussion**

Following the coding of the interview transcripts, the analysis revealed several core themes regarding the teaching needs of engineering and business faculty. These themes are student literature research skills, project-based learning, and electronic access to materials and resources. The themes are expanded upon in the following subsections.

### *Student Literature Research Skills*

Developing student literature research and information literacy skills are perhaps what most people would think of when considering how librarians support faculty teaching needs. However, it is not always a librarian that introduces these concepts to students. Faculty themselves will teach their students about the importance of thorough literature reviews and evaluating sources, as was shown through the faculty interviews conducted. It is important to reiterate that the author (and librarian) conducting these interviews did not provide in-class or other information literacy instruction for the faculty that participated in the research. In some cases, with engineering faculty, the author had a relationship established but had not been asked to provide a guest lecture or any other instruction for their students. And in the case of business faculty, the author was not the current liaison to the School of Management; several interim liaisons had been assigned to the school for a period of time while the Libraries conducted a search to fill the vacancy.

Despite the lack of a formal librarian presence in the faculty members' classes, many still stressed the importance of literature research skills in their classes. One stated, "I definitely encourage them to go online and search, there's so much information out there." Another stated, "it's important for [the students] to understand the difference between just searching the web and going into a more reliable source." Faculty from both engineering and business pointed out a variety of resources they talk about with their students ranging from databases like Factiva and Web of Science to other free and governmental resources, such as EuroMonitor and the Bureau of Labor Statistics. Another faculty member confirmed that they do take class time to talk about the research process as a whole, "how to plan for it, how to search, how to screen results and narrow down."

Others expressed it is an area where they could "do better," as one faculty stated. Several faculty articulated that time is a factor in providing this additional instruction and would rather advise students to seek out a librarian on their own time. Another readily admitted they likely should be working with a librarian saying, "I actually don't know why I would not have [the librarian] provide some sort of introduction [on the topic of research]."

Only a few faculty members indicated that library research skills were not needed for their particular class. And at least two faculty members stated that they assumed students should have those skills already when entering their classes, as they thought all students were required to take ENGL 105. ENGL 105 is a writing and rhetoric class for freshmen that incorporates several class sessions taught by a librarian from the Libraries Education Services team. However, it should be

noted that this class is not required for all freshmen as some can receive credit for the course based on advanced placement (AP) courses from high school. There are other means for students to test out as well, especially those for non-native speakers of English.

Comparing the answers of business to engineering faculty ultimately shows that there is an opportunity for the subject librarians to provide more instruction and resources for student research skills. Since the Covid-19 pandemic, many liaison librarians at UB (and beyond) have provided more instruction as recorded modules that can be then watched “on demand” as well as multiple times. This option could and should be offered more to support faculty teaching while understanding that some courses do not allow time for an in-person librarian lecture.

### *Project Based Learning*

Both business and engineering faculty spoke about their desire to incorporate project-based learning into their courses. As one business faculty said when asked about tests, papers, or other projects in their course, “No tests, but yes, definitely papers [but] not the traditional college essays.” They go on to say their students create materials for the course, ones that simulate materials they might make in a future career such as persuasive memos, informative pamphlets, etc. Another business faculty member spoke about working with local non-profit organizations or other non-governmental organizations (NGOs) in their classroom.

The faculty acknowledges the difficulty of using project-based learning in courses that have multiple sections and therefore could have multiple instructors who need to agree on a

standardized course syllabus, as well as courses that have a high number of enrolled students, as project-based learning is typically done with smaller groups.

Faculty from both business and engineering mentioned the need for resources such as case studies to aid in incorporating more project-based learning in their courses. Business faculty specifically mentioned Harvard Business Review case studies. They spoke of how well-regarded they are in teaching business, but also the cost. Currently, UB Libraries does not have access to Harvard Business Review case studies, and as many librarians understand, they are not able to be borrowed via interlibrary loan.

Faculty also spoke of their desire to have more help in creating or locating case studies and other experiential learning opportunities for their students. With the rise of open educational resources (OER), this is an area that librarians, including the author, can investigate and possibly facilitate.

When comparing the responses from engineering and business faculty, again there is little difference from those that participated in the interviews. The author observed that there is more overlap between the two schools than initially expected, as faculty from both areas have a desire and need for project-based learning and experiential learning resources. Finding appropriate case studies to employ in the classroom appears to be an area where the librarian can assist further, either through obtaining access to books, databases, and other resources that provide case studies or other project-based learning modules or perhaps helping to create these resources that are then customized to the instructor. Connecting faculty with librarians in the Scholarly Communications



team to create OER could be another solution that benefits the faculty and students at UB and beyond.

### *Electronic Access to Materials and Resources*

As noted previously, the business faculty were interviewed in Fall 2018, before the Covid-19 pandemic, while the engineering faculty were interviewed in Summer 2020, only months after the pandemic began. However, electronic access to library resources is not a novel idea, and therefore both groups of faculty were asked about electronic access to materials and resources and how they did or did not incorporate such resources into their classes.

When analyzing the interview transcripts, “electronic access to materials and resources” was a code used for any discussion related to the electronic access to resources such as textbooks (e-books), journal articles, research databases, or freely/publicly available information such as datasets, government reports, or YouTube videos. “Electronic access” then referred to faculty or students accessing the resources through subscription or publicly available databases or websites, through the library website, or through materials made available through Blackboard, the UB learning management system.

Electronic access to resources was a priority for all faculty interviewed, but perhaps unsurprisingly, especially important in the conversations with engineering faculty in the summer of 2020, not long after the start of the Covid-19 pandemic. When engineering faculty were interviewed, they were busily preparing for an unprecedented semester of almost complete virtual instruction, whether asynchronous or synchronous. As one faculty member stated, “I’m

working through the syllabus [for my fall 2020 class] now, recording all the lectures. I plan to teach synchronously as well but the department asked that classes are made available asynchronously as well.” Having access to resources electronically made it easier for these faculty to prepare for their classes. As one mentioned, “I am relying heavily on additional readings that I’ve obtained through the Libraries and then make available [to my students] via [Blackboard].”

A business faculty member spoke about the school’s offering of digital access classes or a hybrid approach to teaching where students could attend in person or watch a live video feed. This is done as some students were (and continue to be) located in a different country while attending the UB School of Management. Video instruction had been done for years before Covid, so having electronic access to materials and resources was an equity issue with students located around the globe. “I use [Blackboard], and so I keep all [additional course readings] there, too, so it’s really easy for students to access,” the faculty member stated.

An issue both business and engineering faculty touched on was when UB did not have access to specific resources or items that were needed, especially journal and news articles. As one faculty member stated:

“I do know that sometimes with articles, and maybe this was more when I would be looking for something to post, but even sometimes with students, they might provide a link to, let's say The Washington Post or The New York Times, UB might not [have access]. And I understand that. They need to make some money. But that can be an issue.

And I know, you can subscribe and get discounts and stuff as a professor, but that's just me. That doesn't mean I can put up a link to an article and all my students can look at it.”

The faculty member admitted being frustrated when only certain people within the university have access to certain resources, such as the Law School having access to Lexis, when that information is pertinent to others outside of that group. They also conveyed they understand the situation is complex, especially from the perspective of the Libraries, in how to go about setting up individualized access. While obtaining a single article for research and teaching purposes is one thing, demonstrating a tool to students for educational purposes is quite another task.

There is much information to unpack for UB librarians, including the author, concerning all responses surrounding electronic access to materials and resources. Making faculty aware of what they can use within Blackboard, in terms of library resources including LibGuides, would be a good first step, in the author's opinion. All business and engineering faculty acknowledged using Blackboard, but in various ways. While UB has other departments that assist faculty in learning how to implement Blackboard, perhaps a bigger push is needed from liaison librarians, at least in these areas, reminding faculty to use Blackboard to link to or share citations of additional course readings.

A separate initiative should be, from the author's viewpoint, additional fact-finding on what faculty need to support their teaching (as well as their research) and identify where the gaps lie. This is easier said than done in many cases for a variety of reasons. For one, it can be difficult to obtain this information from faculty (i.e., low response rates from surveys or time-consuming

one-on-one conversations), and faculty might not know what they need if they do not know it exists. Secondly, it can be a complex conversation to ask faculty what resources they need from the library while explaining that budgets might not allow additional resources now or in the immediate future. However, knowledge is power, and without knowing what additional or expanded resources are needed, the librarian cannot provide the best service. In this specific case, the author has shared information regarding the business faculty responses with the new business liaison librarian and continues to have discussions with the Libraries Collections Committee surrounding electronic access to resources to support the teaching and research needs of engineering and business faculty.

### **Study Limitations & Future Research**

One glaringly obvious difference in the responses between engineering and business faculty is the timing of the studies. Specifically, the business faculty study took place in Fall 2018, long before the Covid-19 pandemic enforced significant changes in the interests of public health in the form of isolation and ‘social distancing.’ Conversely, the engineering faculty study took place in Summer 2020, immediately following the abrupt shutdown of UB (like many, if not all, other U.S. academic institutions) just months beforehand. The engineering faculty, therefore, had just finished a semester where they had to quickly move their courses online and were preparing for their first full semester of remote instruction. Covid-19 was unsurprisingly part of the responses from all engineering faculty, whether it was a direct part of the question or not. Therefore, future research at UB could potentially replicate the engineering faculty study after instruction had returned to some sense of “normalcy,” even if it never looks the same as it did before March

2020. Along the same lines, it would be useful to replicate the business faculty study concurrently to better understand the impact of Covid on their own instruction needs.

Another limitation of both studies and called out in the respective papers is the number of faculty interviewed. A large increase in the number of interviews may not have been a realistic and scalable goal for the author as the sole researcher on both projects, but if these studies were to be replicated in the future, the author would invite more librarians to participate as interviewers in an attempt to recruit more faculty for interviews. The addition of more interview transcripts would likely provide a greater opportunity for other themes to be illuminated.

Lastly, it is important to state again that while the interviews were meant to be semi-structured, to provide more flexibility in the conversations, the interview questions between the two studies did vary somewhat. As was noted in the paper regarding the engineering faculty interviews, this was done purposefully for a variety of reasons, however, it is still viewed by the author as a limitation of this analysis.

## **Conclusion**

When looking at the teaching needs of engineering faculty in comparison to business faculty, the analysis of these two separate studies indicates that faculty have more similarities than differences. As teaching faculty continue to evolve their teaching practices, especially following the Covid-19 global pandemic, librarians have an opportunity to investigate how they can provide support. That support could be holding new or refreshed conversations related to library resources including databases and other electronic tools. Or, that support could take the form of

collaboration on course-related units and assignments. Faculty can find that support by learning directly from librarians about new tools or free resources (including open educational resources). Therefore, open and consistent communication between the faculty and liaison librarians remains a crucial component of the relationship.

## References

- [1] E.M. Rowley, "Examining the Undergraduate Teaching Practices of Faculty in the School of Management," [REDACTED], 2019. [Online]. Available: <http://hdl.handle.net/10477/80367>
- [2] E.M. Rowley, "Examining the Teaching Needs of Engineering Faculty: How the Library and Librarian Fit In," presented at the 2021 ASEE Virtual Annual Conference Content Access, Virtual Conference, July, 2021.
- [3] K. Tanaka *et al.*, *Teaching Business: Looking at the Support Needs of Instructors*. Ithaca S+R, 2019.
- [4] Ithaca S+R. "About." <https://sr.ithaca.org/about/> (accessed February 14, 2022).
- [5] D. Cooper *et al.*, "Supporting the Changing Research Practices of Agriculture Scholars," New York, NY, 2017.
- [6] D. Cooper *et al.*, "Supporting the Changing Research Practices of Asian Studies Scholars," New York, NY, 2018.
- [7] D. Cooper *et al.*, "Supporting the Changing Research Practices of Public Health Scholars," New York, NY, 2017.
- [8] D. Cooper *et al.*, "Supporting Research in Languages and Literature," New York, NY, 2020.
- [9] D. Cooper *et al.*, "Supporting the Changing Research Practices of Religious Studies Scholars," New York, NY, 2017.
- [10] D. Cooper *et al.*, "Supporting the Changing Research Practices of Civil and Environmental Engineering Scholars," New York, NY, 2018.
- [11] M. P. Long and R. C. Schonfeld, "Supporting the Changing Research Practices of Chemists," New York, NY, 2013.
- [12] J. Rutner and R. C. Schonfeld, "Supporting the Changing Research Practices of Historians," New York, NY, 2012.
- [13] R. C. Schonfeld and M. P. Long, "Supporting the Changing Research Practices of Art Historians," New York, NY, 2014.
- [14] University at Buffalo Office of Admissions. "UB Fast Facts." <https://admissions.buffalo.edu/academics/about-ub.php> (accessed February 14, 2022).
- [15] University at Buffalo School of Management. "Facts and Figures." <https://management.buffalo.edu/about/facts-figures.html> (accessed February 14, 2022).
- [16] University at Buffalo School of Engineering and Applied Sciences. "By the Numbers." <http://engineering.buffalo.edu/home/school/about/glance.html> (accessed February 14, 2022).
- [17] A. Ireland, D. S. Thompson, and B. Bourke, "Examining the pedagogical practices of business faculty: a qualitative analysis to inform library support," 2019.
- [18] A. Ireland, D. S. Thompson, and B. Bourke, "Business pedagogy: a qualitative analysis to inform library support," *Performance measurement and metrics*, vol. 21, no. 2, pp. 81-92, 2020, doi: 10.1108/PMM-12-2019-0056.
- [19] M. Besterfield-Sacre, M. F. Cox, M. Borrego, K. Beddoes, and J. Zhu, "Changing Engineering Education: Views of U.S. Faculty, Chairs, and Deans," *Journal of engineering education (Washington, D.C.)*, vol. 103, no. 2, pp. 193-219, 2014, doi: 10.1002/jee.20043.
- [20] R. Brent and R. M. Felder, "A model for engineering faculty development," *International Journal of Engineering Education*, vol. 19, no. 2, pp. 234-240, 2003.

- [21] D. Schaefer and T. Utschig, "A review of professional qualification, development, and recognition of faculty teaching in higher education around the world," presented at the 2008 ASEE Annual Conference & Exposition, Pittsburgh, Pennsylvania, June 22, 2008. [Online]. Available: <https://peer.asee.org/3965>.
- [22] T. T. Utschig and D. Schaefer, "Opportunities and challenges in professional education-related faculty development in the US," in *2008 38th Annual Frontiers in Education Conference*, 22-25 Oct. 2008 2008, pp. S4D-17-S4D-22, doi: 10.1109/FIE.2008.4720622.
- [23] M. O. Forbes, M. T. Hickey, and J. White, "Adjunct faculty development: Reported needs and innovative solutions," *Journal of Professional Nursing*, vol. 26, no. 2, pp. 116-124, 2010.
- [24] J. W. Lancaster, S. M. Stein, L. G. MacLean, J. Van Amburgh, and A. M. Persky, "Faculty development program models to advance teaching and learning within health science programs," *American journal of pharmaceutical education*, vol. 78, no. 5, 2014.
- [25] M. Scarbecz, C. K. Russell, R. G. Shreve, M. M. Robinson, and C. R. Scheid, "Faculty development to improve teaching at a health sciences center: a needs assessment," *Journal of Dental Education*, vol. 75, no. 2, pp. 145-159, 2011.
- [26] I. Singh and A. Jha, "Teacher effectiveness in relation to emotional intelligence among medical and engineering faculty members," *Europe's Journal of Psychology*, vol. 8, no. 4, pp. 667-685, 2012.
- [27] C. Hixson, E. Ingram, J. Williams, H. Matusovich, and R. McCord, "The Rising Engineering Education Faculty Experience (REEFE): Preparing Junior Colleagues," 2015.
- [28] M. T. Hora and C. Lee, "How, If at All, Does Industry Experience Influence How Faculty Teach Cognitive, Inter-, and Intrapersonal Skills in the College Classroom?," University of Wisconsin–Madison, WCER Working Paper No. 2020-2, March 2020. [Online]. Available: [https://wcer.wisc.edu/docs/working-papers/WCER\\_Working\\_Paper\\_No\\_2020\\_2](https://wcer.wisc.edu/docs/working-papers/WCER_Working_Paper_No_2020_2)
- [29] S. Korobili, I. Tilikidou, and A. Delistavrou, "Factors that influence the use of library resources by faculty members," *Library review (Glasgow)*, vol. 55, no. 2, pp. 91-105, 2006, doi: 10.1108/00242530610649594.
- [30] R. Callison, D. Budny, and K. Thomes, "Library research project for first-year engineering students: results from collaboration by teaching and library faculty," *The Reference Librarian*, vol. 43, no. 89-90, pp. 93-106, 2005.
- [31] L. Feldmann and J. Feldmann, "Developing information literacy skills in freshmen engineering technology students," in *30th Annual Frontiers in Education Conference. Building on A Century of Progress in Engineering Education. Conference Proceedings (IEEE Cat. No.00CH37135)*, 18-21 Oct. 2000 2000, vol. 2, pp. S2E/1-S2E/4 vol.2, doi: 10.1109/FIE.2000.896650.
- [32] S. Y. Harris, "Undergraduates' assessment of Science, Technology, Engineering and Mathematics (STEM) information literacy instruction," *IFLA Journal*, Article vol. 43, no. 2, pp. 171-186, 06// 2017, doi: 10.1177/0340035216684522.
- [33] T. Koler-Povh and Z. Turk, "Information literacy of doctoral students in engineering and the librarian's role," *Journal of librarianship and information science*, vol. 52, no. 1, pp. 27-39, 2020, doi: 10.1177/0961000618767726.



- [34] G. Leckie and A. Fullerton, "Information literacy in science and engineering undergraduate education," *College and Research Libraries*, vol. 60, no. 1, pp. 9-29, 1999, doi: 10.5860/crl.60.1.9.
- [35] K. Mercer, K. D. Waever, R. Figueiredo, and C. Carter, "The key to unlocking information literacy in the STEM disciplines," *College & Research Libraries News*, vol. 81, no. 3, 2020.
- [36] A. Trussell, "Librarians and engineering faculty: Partnership opportunities in information literacy and ethics instruction," in *International Association of Scientific and Technological University Libraries (IATUL)*, Krakow, Poland, May 30-June 3 2004. [Online]. Available: <https://docs.lib.purdue.edu/iatul/2004/papers/36/>. [Online]. Available: <https://docs.lib.purdue.edu/iatul/2004/papers/36/>
- [37] N. Waters, E. Kasuto, and F. McNaughton, "Partnership between Engineering Libraries: Identifying Information Literacy Skills for a Successful Transition from Student to Professional," *Science & technology libraries (New York, N.Y.)*, vol. 31, no. 1, pp. 124-132, 2012, doi: 10.1080/0194262X.2012.648104.
- [38] C. T. Atwong and L. J. Heichman Taylor, "Integrating Information Literacy into Business Education: A Successful Case of Faculty-Librarian Collaboration," *Journal of business & finance librarianship*, vol. 13, no. 4, pp. 433-448, 2008, doi: 10.1080/08963560802202227.
- [39] M. Cooney, "Business Information Literacy Instruction: A Survey and Progress Report," *Journal of business & finance librarianship*, vol. 11, no. 1, pp. 3-25, 2005, doi: 10.1300/J109v11n01\_02.
- [40] B. Detlor, H. Julien, R. Willson, A. Serenko, and M. Lavalley, "Learning outcomes of information literacy instruction at business schools," *Journal of the American Society for Information Science and Technology*, vol. 62, no. 3, pp. 572-585, 2011, doi: 10.1002/asi.21474.
- [41] C. V. McInnis Bowers, B. Chew, M. R. Bowers, C. E. Ford, C. Smith, and C. Herrington, "Interdisciplinary Synergy: A Partnership Between Business and Library Faculty and Its Effects on Students' Information Literacy," *Journal of business & finance librarianship*, vol. 14, no. 2, pp. 110-127, 2009, doi: 10.1080/08963560802362179.
- [42] A. Natt, "What Is Business Information Literacy and Can the Corporate Librarian Contribute Anything to the Discourse?," *Journal of business & finance librarianship*, vol. 18, no. 2, pp. 146-174, 2013, doi: 10.1080/08963568.2013.769290.
- [43] Y. D. Wu and S. Lee Kendall, "Teaching faculty's perspectives on business information literacy," *Reference services review*, vol. 34, no. 1, pp. 86-96, 2006, doi: 10.1108/00907320610648789.
- [44] M. Phillips, A. Van Epps, N. Johnson, and D. Zwicky, "Effective Engineering Information Literacy Instruction: A Systematic Literature Review," *The Journal of academic librarianship*, vol. 44, no. 6, pp. 705-711, 2018, doi: 10.1016/j.acalib.2018.10.006.
- [45] A. M. Fiegen, "Business Information Literacy: A Synthesis for Best Practices," *Journal of business & finance librarianship*, vol. 16, no. 4, pp. 267-288, 2011, doi: 10.1080/08963568.2011.606095.

## **Appendix A: Business Faculty Recruitment Email**

Subject: Libraries study on teaching in business

Dear [First Name of instructor],

The University Libraries at UB is conducting a research study on the teaching support needs of instructors in order to improve services for the School of Management. Would you be willing to participate in a one-hour interview to share your unique experiences and perspectives?

Our local UB study is part of a larger suite of parallel studies with other institutions of higher education in the U.S., coordinated by Ithaca S+R, a not-for-profit research and consulting service. The information gathered at UB will also be included in a landmark final report by Ithaca S+R and will be essential for UB to further understand how the teaching support needs of Business instructors are evolving more widely.

If you agree to participate, the interview can be conducted in your office. If you do not have an office available, my office in Lockwood Library can be used instead.

If you have any questions about the study, please don't hesitate to reach out and thank you so much for your consideration.

Sincerely,

NAME

Principal Investigator

## **Appendix B: Engineering Faculty Recruitment Email**

Subject: Libraries study on teaching in engineering

Dear [First Name of instructor],

The University at Buffalo Libraries is conducting a research study on the teaching support needs of instructors in order to improve services for the School of Engineering and Applied Sciences. Would you be willing to participate in a one-hour interview to share your unique experiences and perspectives?

The information gathered at UB will be essential for UB Libraries to further understand how the teaching support needs of engineering faculty and instructors are evolving, and where the Libraries can provide additional assistance.

If you agree to participate, the interview will be conducted virtually via Zoom. The interview will be recorded in Zoom so a transcription can be created. Transcripts will be de-identified and

used for coding and analysis purposes. The recordings will not be viewed by anyone other than the PI and will be deleted as soon as a de-identified transcript is created.

If you have any questions about the study, please don't hesitate to reach out and thank you so much for your consideration.

Sincerely,

NAME

Principal Investigator

## **Appendix C: Business Faculty Interview Guide**

### **Background and Methods**

1. Tell me about your experiences as a teacher [e.g., How long you've been teaching, what you typically teach, what you currently teach]

- Does your teaching incorporate any particular teaching methods or approaches? [e.g., experiential learning, case method, design thinking, problem-based learning, flipped classroom]?
- Have you received any support/relied on others towards developing your teaching approach?
- Are there any other supports or resources that you think would be helpful for you?

2. Do you currently teach more general research or study skills in any of your courses? [e.g., finding sources, evaluating sources, data literacy, financial literacy, critical thinking]

- How do you incorporate this into your courses? Have you experienced any challenges in doing so?
- Does anyone support you in doing so and if so, how? [e.g., instruction classes offered through the library]
- Are there any other forms of support that would be helpful in doing this?

### **Working with Materials and Content**

3. What materials do you typically create in the process of developing a course? [e.g., syllabi, course website, online modules, lectures, assignments, tests]

- How do you make these materials available to students?
- Do you make these materials more widely available? [e.g., public course website or personal website, sharing via listserv]
- How you experienced any challenges in creating and/or making these materials available?

- Do you ever consult with others as part of creating and/or making these materials available?
- Are there any supports that could help you in creating and/or making these materials available?

4. Beyond the materials you create in the process of developing a course, what other kinds of content to students typically work with in your courses? [e.g., readings from textbooks or other sources, practice datasets, films]

- How involved are you in how this content is selected and/or created?
- How do you make these materials available to students?
- Do you make these materials more widely available? [e.g., public course website or personal website, sharing via listserv]
- How you experienced any challenges in selecting, creating and/or making these materials available?
- Do you ever consult with others as part of selecting, creating and/or making these materials available?
- Are there any supports that could help you in selecting, creating and/or making these materials available?

### **Working with Tools**

5. Have you considered using and/or are you currently working with data and/or analytics tools to understand and improve your teaching? [e.g., dashboard or an app through a course management system, early alert notification system on student performance via email]

- If no, why? (e.g., unaware of such offerings, current offerings are not useful, opposed to such offerings)
- If a tool could be designed that leverages data (e.g., about students) in a way that would be helpful towards your teaching, what data would feed into this and how would this tool ideally work?
- Do you have any concerns in relation to how this data is collected and/or leveraged (e.g., privacy)?
- If yes, what data and/or tools have you used and how? To what extent was this useful?
- Do you have any concerns in relation to how this data is collected and/or leveraged (e.g., privacy)?
- What are some of the greatest challenges you've encountered in the process of using these tools?
- Do you rely on anyone to support you in using these tools?
- Are there any other forms of support that would help you as you work with these tools?

6. Do you rely on any other tools to support your teaching (e.g., clickers, smart boards)? If so,

- What are some of the greatest challenges you've encountered in the process of using these tools?
- Do you rely on anyone to learn about and/or support you in using these tools?

- Are there any other forms of support that would help you as you work with these tools?

## **Wrapping Up**

7. If there was a magic wand that could help you with some aspect of your teaching [beyond giving you more money, time, or smarter students], what would you ask it to do for you?
8. Are there any ways that library or others on campus have helped you with your teaching in ways that have not yet come up in this interview?
9. Are there any issues relating to your experiences teaching that you think that librarians and/or others on campus who support you and your students should be aware of that have not yet come up in our discussion? [e.g., on the role of the library in supporting teaching, what makes teaching in your specific area of Business or Business more widely that warrants unique support]

## **Appendix D: Engineering Faculty Interview Guide**

1. Tell me about your experiences as a teacher [e.g., How long you've been teaching, what you typically teach, what you currently teach]
  - Does your teaching incorporate any particular teaching methods or approaches? [e.g., experiential learning, case method, design thinking, problem-based learning, flipped classroom]?
  - What type of support have you received regarding your teaching?
2. Do you currently teach more general research or study skills in any of your courses? [e.g., finding sources, evaluating sources, data literacy, financial literacy, critical thinking]
  - How do you incorporate this into your courses? Have you experienced any challenges in doing so?
3. What materials do you typically create in the process of developing a course? [e.g., syllabi, course website, online modules, lectures, assignments, tests]
  - How do you make these materials available to students?
  - Have you experienced any challenges in creating and/or making these materials available?
4. Beyond the materials you create in the process of developing a course, what other kinds of content do students typically work with in your courses? [e.g., readings from textbooks or other sources, practice datasets, films]
  - How involved are you in how this content is selected and/or created?
  - How do you make these materials available to students?
  - Have you experienced any challenges in selecting, creating and/or making these materials available?

5. Is library or scholarly research needed for any of the classes you teach?
- If so, do you talk with your students about how and where to conduct this research?
  - Do you talk with your students about evaluating sources?
6. How did you shift to online teaching with the Covid-19 pandemic in the Spring 2020 semester?
7. How has Covid-19 impacted how you are preparing for the upcoming Fall 2020 semester?
8. Are there any ways that the library or others on campus have helped you with your teaching in ways that have not yet come up in this interview?

### Appendix E: Coding Scheme

Code	Definition
Course materials	Any materials used or created for courses by faculty
Covid-19	Any discussion related to Covid-19
Electronic access to resources	Electronic access to library resources including databases, journals, e-books, and other information sources
Library and librarian	Any discussion of the library and/or librarian as it relates to faculty teaching
Open Educational Resources (OERs)	Any discussion related to OERs or other freely available resources
Student research and searching skills	Library and scholarly research skills of students via databases or the internet
Teaching style and methods	Teaching practices of faculty

Virtual learning

Discussion related to courses moved to a completely remote or hybrid format; preparing to move courses to completely remote or hybrid format